IS 10583 (1983): Sodium Alginate for Textile Industry [TXD 7: Textile Sizing and Finishing Materials]

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IS : 10583 - 1983

Indian Standard

SPECIFICATION FOR SODIUM ALGINATE FOR TEXTILE INDUSTRY

UDC 661.833 : 677.011

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3 *September* 1983

Indian Standard

SPECIFICATION FOR SODIUM ALGINATE FOR TEXTILE INDUSTRY

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AMENDMENT NO. 1 MAY 1984

TO

IS:10583-1983 SPECIFICATION FOR SODIUM ALGINATE FOR TEXTILE INDUSTRY

Errata

(*Page 3, clause 0.2, second line*) - Add the word 'standard' between the words 'This' and 'on'.

(*Page 3, clause 0.2, sixth line*) - Substitute 'CMC' *for* 'cmc'.

(*Page 3, clause 2.1, first line*) - Delete 'comma' and add the word 'and' between the words 'brownish' and 'free-flowing'.

(*Page 3, clause 2.1, second line*) - Delete the word 'material'.

(*Page 8, clause A-1.3.1, third line*) - Add the word '5.2 N' between the words 'of' and 'hydrochloric'.

(*Page 8, clause A-1.3.1, fourth line*) - Delete the word '5.2 N'.

(TDC 12)

Reprography Unit, ISI, New Delhi, India

Indian Standard

SPECIFICATION FOR SODIUM ALGINATE FOR TEXTILE INDUSTRY

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 18 February 1983, after the draft finalized by the Textile Sizing and Finishing Materials Sectional Committee had been approved by the Textile Division Council.

0.2 Requirements of sodium alginate, food grade have been covered in IS : 5191-1969*. This on sodium alginate used in the textile industry specifies various requirements, namely, active, moisture, ash and chloride contents and viscosity, for the material to serve well in textile processing. The sodium alginate for textile industry should be free from viscosity building materials like cmc and guar gum.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes requirements for sodium alginate for use in dyeing and printing in the textile industry.

2. REQUIREMENTS

2 1 Description — The material shall be light to dark brownish, free-flowing material.

2.2 Solubility

2.2.1 The material shall form a viscous, colloidal solution with water.

*Specification for sodium alginate, food grade.
†Rules for rounding off numerical values (*revised*).

2.2.2 It shall be insoluble in alcohol and in aqueous alcohol solution containing 30 percent or more by mass of alcohol.

2.2.3 It shall be insoluble in chloroform and ether.

2.3 Identification Tests

2.3.1 Take 5 ml of 1 percent solution of the material and add to it 1 ml of 7·5 percent solution of calcium chloride. A voluminous gelatinous precipitate shall form.

2.3.2 Take 10 ml of 1 percent solution of the material and add to it dilute sulphuric acid (10 percent). A heavy gelatinous precipitate shall form.

2.3.3 *Test for Alginic Acid* — Take a quantity of material equivalent to 5 mg of alginic acid in a test-tube. Add 5 ml of water, 1 ml of a freshly prepared 1 in 100 solution of naphthoresorcinol in ethanol and 5 ml of concentrated hydrochloric acid. Heat the mixture to boiling. Boil gently for about 3 minutes and then cool to about 15°C. Transfer the contents of the test-tube to a 30-ml separator with the aid of 5 ml of water and extract with 15 ml of isopropyl ether. Perform a blank using the same quantities of same reagents by the same procedure omitting the sample. The isopropyl ether extract from the material shall exhibit a deeper purplish hue than that from the blank.

2.3.4 *Test for Sodium* — Extract the ash obtained from the material with dilute hydrochloric acid (10 percent) and filter. Add uranyl zinc acetate to the filtrate. A yellow, crystalline precipitate shall form after several minutes agitation.

2.4 The material shall also comply with the requirements of Table 1.

TABLE 1 REQUIREMENTS OF SODIUM ALGINATE

Sl No.	Characteristic	Requirement	Method of Test (Appendix A)
(1)	(2)	(3)	(4)
i)	Active content (purity), percent by mass, *Min*	60	A-1
ii)	Moisture content, percent by mass, *Max*	15	A-2
iii)	Ash content, percent by mass, *Max*	40	A-3
iv)	Chloride content (as NaCl), percent by mass, *Max*	5	A-4
v)	Viscosity, cP, *Min*	50	A-5

3. PACKING AND MARKING

3.1 The material shall be packed in adequately waterproofed packages providing total protection from moisture, dust, etc as detailed in the contract or order.

3.2 Each package shall be marked with net mass (g or kg), name/trademark of the manufacturer, viscosity and date of packing.

3.2.1 Each package may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution

4. SAMPLING

4.1 Lot — The quantity of sodium alginate delivered to a buyer against one despatch note shall constitute a lot.

4.2 Unless otherwise agreed to between the buyer and the seller, the number of packages to be selected from a lot shall be as follows:

No. of Packages in the Lot	*No. of Packages to be Selected*
(1)	(2)
Up to 15	3
16 „ 25	4
26 „ 50	5
51 „ 100	7
101 and above	10

4.3 From different parts of each package selected according to **4.2**, small portions of the material shall be taken out using a suitable sampling scoop. The total quantity of material drawn from a package shall be mixed.

4.4 If, on visual examination, the samples drawn from different packages are found to be homogeneous, mix them thoroughly to form a composite sample.

4.5 The lot shall be considered conforming to the requirement of the standard if the composite sample meets the various requirements specified under **2.**

APPENDIX A

(*Clause* 2.4, *Table* 1)

METHODS OF TEST FOR SODIUM ALGINATE FOR TEXTILE INDUSTRY

A-1. DETERMINATION OF PURITY

A-1.1 Apparatus — The assembly of the apparatus is shown in Fig. 1. It consists essentially of a soda-lime column *A* and a mercury valve *B* connected through a side tube *C* to a reaction flask *D* by means of a rubber connection. The reaction flask *D* is a 100-ml round-bottomed, longnecked boiling flask with 24/40 ground joint attached. It is placed in an oil-bath *E* maintained at 145°C by means of a thermoregulator and an immersion heater.

The reaction flask is provided with a 20-cm reflux condenser *F* terminating in a trap *G* containing 25 g of 850-micron zinc or tin, which is connected to an absorption flask *H* (a 250-ml Erlenmeyer flask equipped with a 24/40 ground joint and a side tube attached a little below the ground joint as shown in Fig. 1).

The flask *H* provided with an absorption tower *J* the lower part of which consists of an 18-mm tube fitted with a medium porosity fritted borosilicate glass or equivalent disc sealed to the inner part of the lower end of a 24/40 ground joint and terminating 1 or 2 mm above the bottom of the absorption flask when the joint is in place. A trap, consisting of a bulb of approximately 100 ml capacity, is blown above the ground portion of the joint, and the outer portion of a 24/40 ground joint is sealed above this bulb. The absorption tower, from the bottom of the disc to the top of ground joint, is approximately 30 cm in length. The top of the tower is fitted with a hollow ground stopper with a short side tube attached. The tower assembly may be attached to a soda-lime tower *K* connected to a water pump by means of a capillary-tube regulator *L* which serves to sweep 1 700 to 2 000 ml of carbon dioxide-free air per hour through the apparatus during the heating period.

A-1.2 Reagents

A-1.2.1 *Hydrochloric Acid* — 5·2 N.

A-1.2.2 *Phosphoric Acid* — syrupy.

A-1.2.3 *Sodium Hydroxide Solution* — 0·25 N.

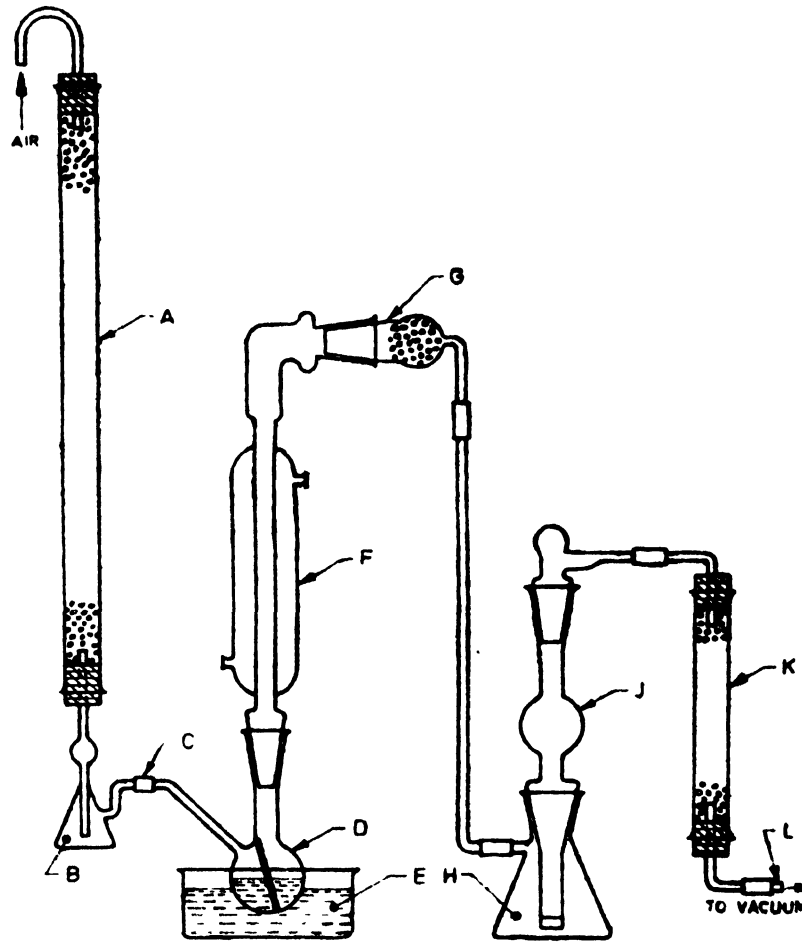

FIG. 1 APPARATUS FOR DETERMINATION OF PURITY

A-1.2.4 *Butanol*

A-1.2.5 *Barium Chloride* ($BaCl_2$, $2H_2O$) *Solution* — 1:10.

A-1.2.6 *Phenolphthalein Solution* — 1 percent in alcohol.

A-1.2.7 *Hydrochloric Acid* — 0·1 N.

A-1.3 Procedure

A-1.3.1 Transfer about 250 mg of the material, previously dried at 105°C for 4 hours and accurately weighed, to the reaction flask *D*, add 30 ml of hydrochloric acid, insert a small boiling tube, and connect 5·2 N the flask to the reflux condenser *F* using syrupy phosphoric acid as lubricant.

NOTE — Stopcock grease may be used for other connections.

A-1.3.2 Draw a current of carbon dioxide-free air through the entire assembly for about 10 minutes and then discontinue it. Disconnect the absorption tower *J*, rapidly transfer from a pipette 25·0 ml of 0·25 N sodium hydroxide into the absorption flask *H*, add 5 drops of butanol and again attach the flask *H* to the absorption tower. Raise the oil-bath *E*, previously heated to 145 ± 2°C, until the oil level is several millimetres above the liquid level in the reaction flask. After the initial rapid evolution of carbon dioxide has subsided, resume the passage of carbon dioxide-free air through the apparatus and continue heating at about 145°C for 2 hours. At the end of the 2-hour period, discontinue the current of air and disconnect the absorption flask *H* and the lower part of the absorption tower *J* from the rest of the assembly. Remove the absorption tower unit, washing any adhering sodium hydroxide solution into the flask with several small portions of water. To the flask add 10 ml of 1 in 10 barium chloride ($BaCl_2$, $2H_2O$) solution, stopper the flask, shake gently for about 2 minutes, add phenolphthalein solution and titrate with 0·1 N hydrochloric acid. Perform a blank determination and make any necessary correction.

A-1.4 Calculation — Each millilitre of 0·25 N sodium hydroxide consumed in the assay is equivalent to 27·75 mg of sodium alginate (equivalent weight 222·00).

A-2. DETERMINATION OF MOISTURE CONTENT

A-2.1 Apparatus

A-2.1.1 *Oven* — maintained at 105 ± 1°C.

A-2.1.2 *Weighing Bottle* — glass-stoppered, shallow, wide-mouthed glass bottle.

A-2.1.3 *Desiccator*

A-2.2 Procedure

A-2.2.1 Dry the weighing bottle with stopper in the drying oven at 105 ± 1°C for 4 hours, cool in a desiccator and allow it to attain room temperature and weigh it. Weigh accurately about 5 g of test sample in the tared weighing bottle and note the mass of the sample. Place the

weighing bottle with the sample, uncovered in the drying oven at 105 ± 1°C for 4 hours. Close the bottle promptly and allow it to come to room temperature in the desiccator. Weigh the bottle with its contents.

A-2.2.2 Calculate the moisture content as follows:

$$\text{Moisture content, percent, by mass} = \frac{100\,(a-b)}{a}$$

where

a = mass of the sample before drying, and

b = mass of the sample after drying to constant value.

A-3. DETERMINATION OF ASH CONTENT

A-3.1 Apparatus

A-3.1.1 *Shallow Ashing Dish* or *Silica Crucible*

A-3.1.2 *Desiccator*

A-3.1.3 *Muffle Furnace* — capable of heating up to 800°C.

A-3.1.4 *Hot Plate or Burner*

A-3.2 Procedure

A-3.2.1 Take a shallow ashing dish or silica crucible. Heat it to redness on a hot plate or burner, cool in the desiccator and weigh it. Weigh accurately about 5 g of test sample in the dish. Gently heat the dish on hot plate or burner untill the sample is well carbonized and increase heat until carbonization is complete. Transfer the dish with its contents to a muffle furnace and ash at about 700°C to constant mass. Cool in the desiccator and weigh.

A-3.2.2 Calculate the ash content as follows:

$$\text{Ash content, percent by mass (dry basis)} = 100 \times \frac{100}{100 - A} \times \frac{M_1}{M_2}$$

where

A = Moisture content percent by mass,

M_1 = Mass of ash in g, and

M_2 = Mass of sample taken for test in g.

A-4. DETERMINATION OF CHLORIDE (NaCl) CONTENT

A-4.1 Procedure

A-4.1.1 Take about 0·5 g of sample in a 250-ml glass beaker. Disperse well with a few millilitres of alcohol and dissolve in water. Neutralize it and titrate against N/10 silver nitrate ($AgNO_3$) solution using potassium chromate as indicator. Observe the end-point as reddish brown precipitate.

A-4.1.2 Calculate the chloride (NaCl) content as follows:

$$\text{Chloride (NaCl) content, percent} = \frac{V \times \mathcal{N} \times 58{\cdot}45 \times 100}{1\,000 \times m}$$

where

V = volume in ml of silver nitrate required to achieve end point,

$\mathcal{N}$ = normality of silver nitrate solution, and

m = dry mass in g of the test sample.

A-5. DETERMINATION OF VISCOSITY

A-5.0 Principle — The resistance to movement of a spindle is measured and expressed in terms of viscosity in seconds. The resistance, being directly linked with viscosity, can be expressed directly in terms of viscosity by previous calibration of the instrument.

A-5.1 Apparatus

A-5.1.1 *Brookfield Viscometer* — Type LV or equivalent

A-5.1.2 *Mechanical Stirrer*

A-5.1.3 *Constant Temperature Bath* — maintained at 25°C.

A-5.2 Procedure

A-5.2.1 Determine the moisture content of the sample (*see* **A-2**). Calculate the mass of sample equivalent to 10 g dry mass, required to make 500 g of test solution as follows:

$$\text{Mass of sample, in g} = \frac{100 \times A}{100 - B}$$

where

A = desired dry mass of sample in g (10 g in this case), and

B = moisture content percent (*see* **A-2**).

A-5.2.2 Take the sample of sodium alginate in a jar and add 100 ml of distilled water. Bring the *p*H of the solution between 6 and 8 by adding hydrochloric acid or sodium hydroxide as the case may be and make total of 500 g solution by adding more distilled water. Place the stirrer in the solution so that the blade is about half way between the bottom of the jar and the surface of the liquid, stir till the sample is dissolved. Remove the agitator and transfer the sample container to the constant temperature bath and keep it there for three hours. Remove the sample container from the bath, stir it again and measure the viscosity with the Brookfield viscometer at 25°C using the spindle and speed given below:

Viscosity Range	*Spindle No.*	*Speed rev/min*	*Scale*
10 to 100	1	60	100

A-5.2.3 Allow the spindle to rotate until constant reading is obtained. Note the reading.

INDIAN STANDARDS

ON

TEXTILE SIZING AND FINISHING MATERIALS

IS:

189-1977 Tamarind kernel powder for use in cotton and jute textile industries (*second revision*)

1184-1977 Maize starch, cotton textile industry (*second revision*)

1605-1977 Tapioca starch, cotton textile industry (*first revision*)

2033-1977 Tapioca flour, cotton textile industry (*first revision*)

5448-1980 Dextrins for textile industry (including British gum) (*first revision*)

9906-1981 Laundry starch

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg m s^{-2}
Energy	joule	J	1 J = 1 N m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemen	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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Printed at Printograph, New Delhi, India